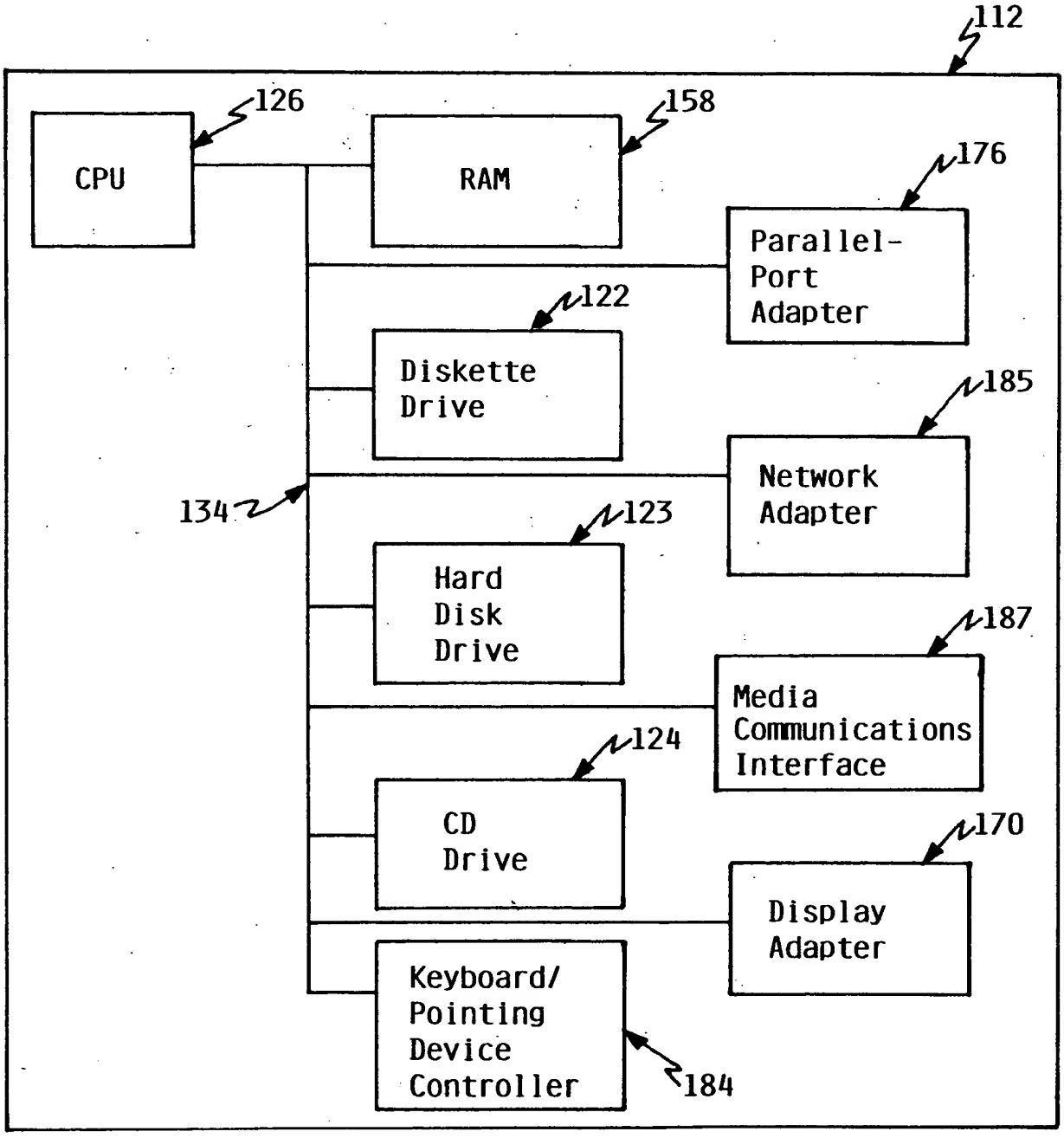

112
126
158
CPU
RAM
176
Parallel-
Port
Adapter
122
Diskette
Drive
185
Network
Adapter
134
123
Hard
Disk
Drive
187
Media
Communications
Interface
124
CD
Drive
170
Display
Adapter
Keyboard/
Pointing
Device
Controller
184

FIGURE 1

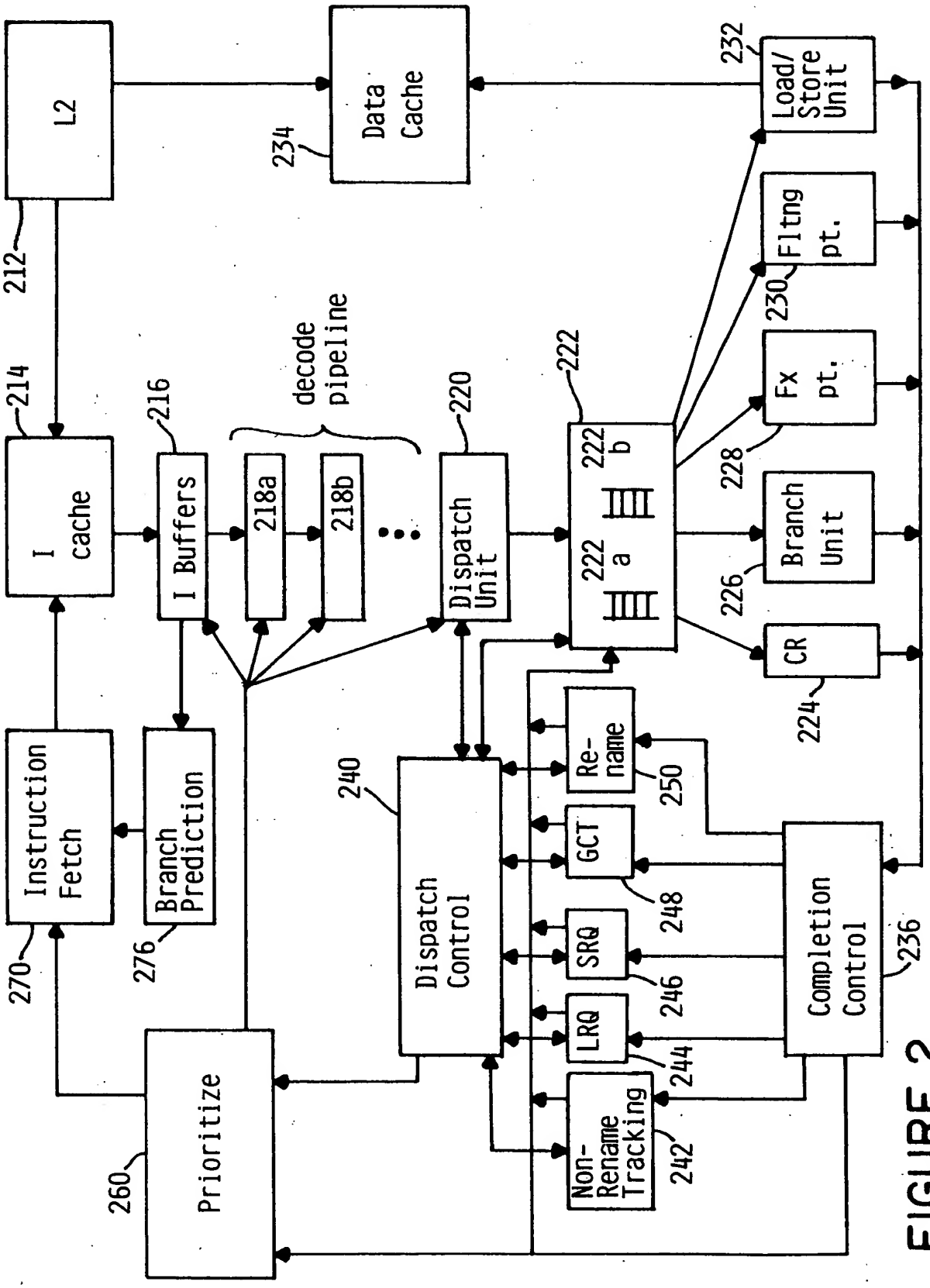

L2
212
Data Cache
234
Load/ Store Unit
232
Fltng pt.
230
Fx pt.
228
Branch Unit
226
CR
224
I cache
214
I Buffers
216
218a
218b
decode pipeline
Dispatch Unit
220
222 a
222 b
222
Instruction Fetch
270
Branch Prediction
276
Dispatch Control
240
Re-name
250
GCT
248
SRQ
246
LRQ
244
Non-Rename Tracking
242
Completion Control
236
Prioritize
260

FIGURE 2

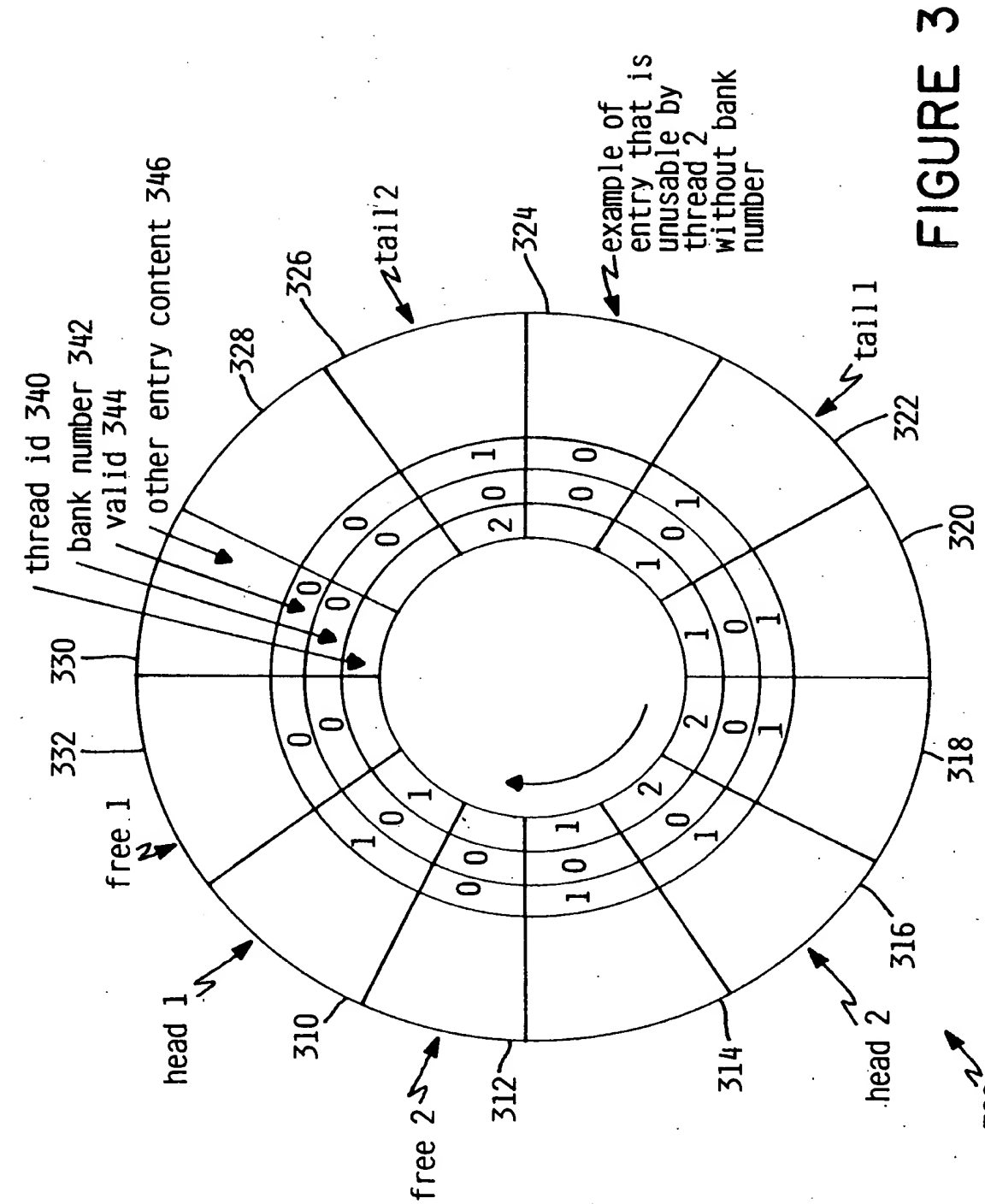

thread id 340
bank number 342
valid 344
other entry content 346
example of entry that is unusable by thread 2 without bank number
tail 2
tail 1
head 1
head 2
free 1
free 2
300
310
312
314
316
318
320
322
324
326
328
330
332

FIGURE 3

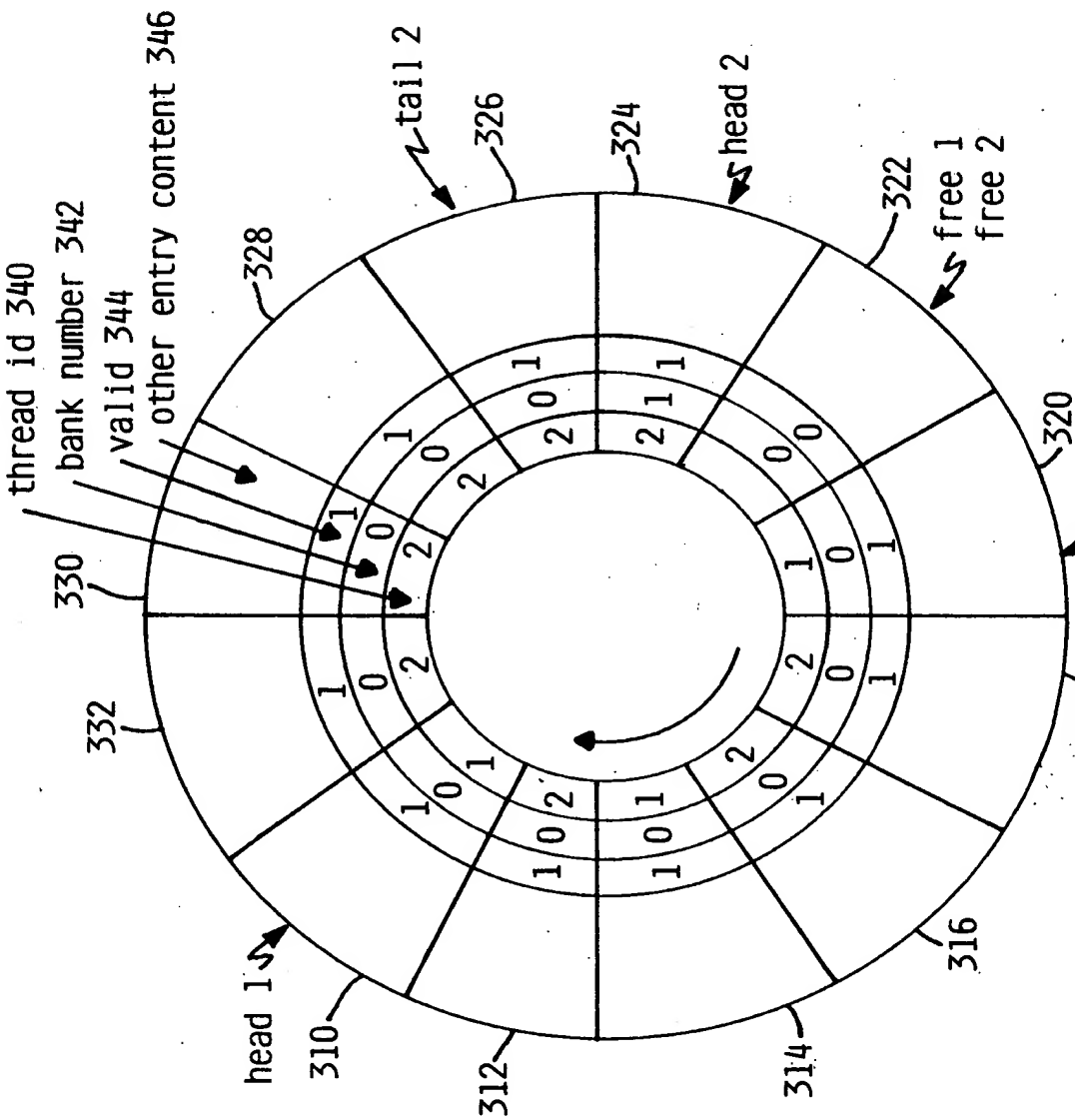

thread id 340
bank number 342
valid 344
other entry content 346
330
328
tail 2
326
324
head 2
322
free 1
free 2
320
tail 1
318
316
314
312
310
head 1
332

FIGURE 4

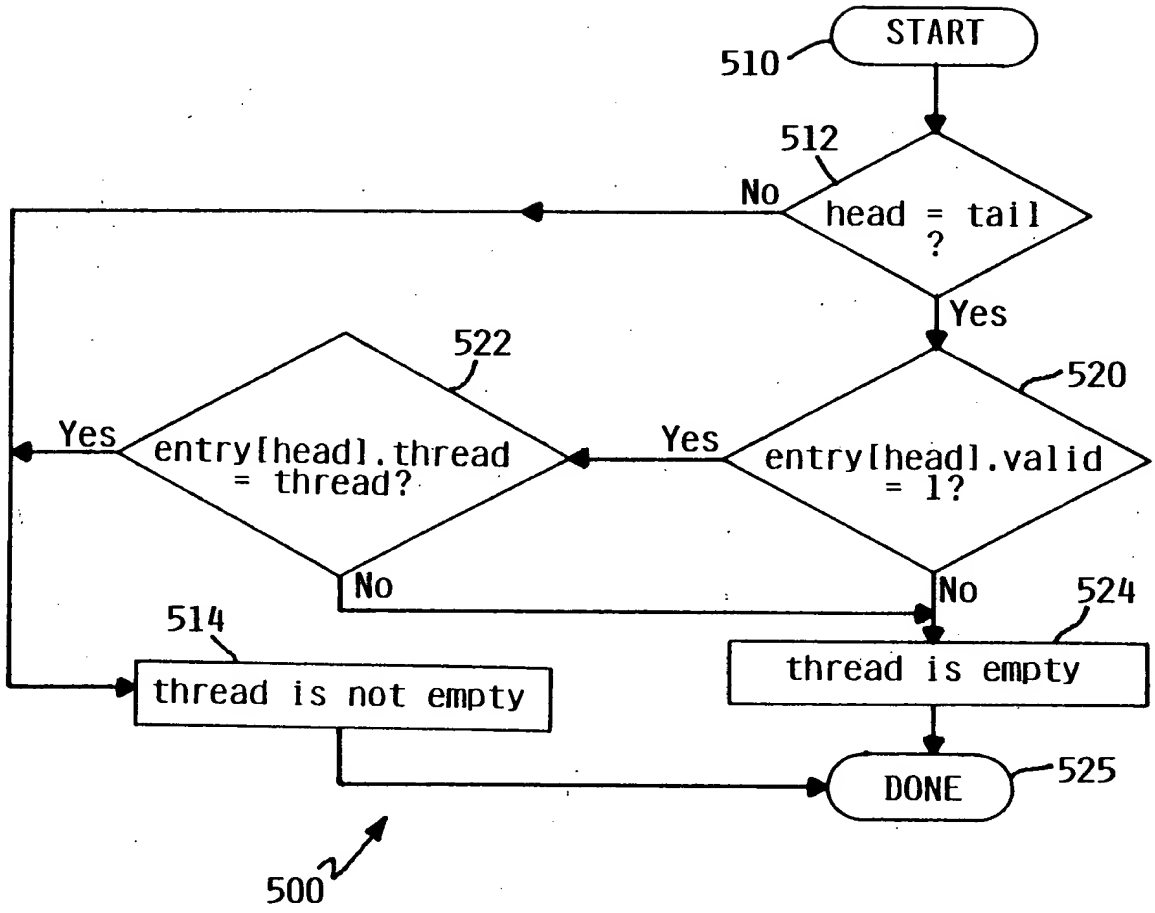
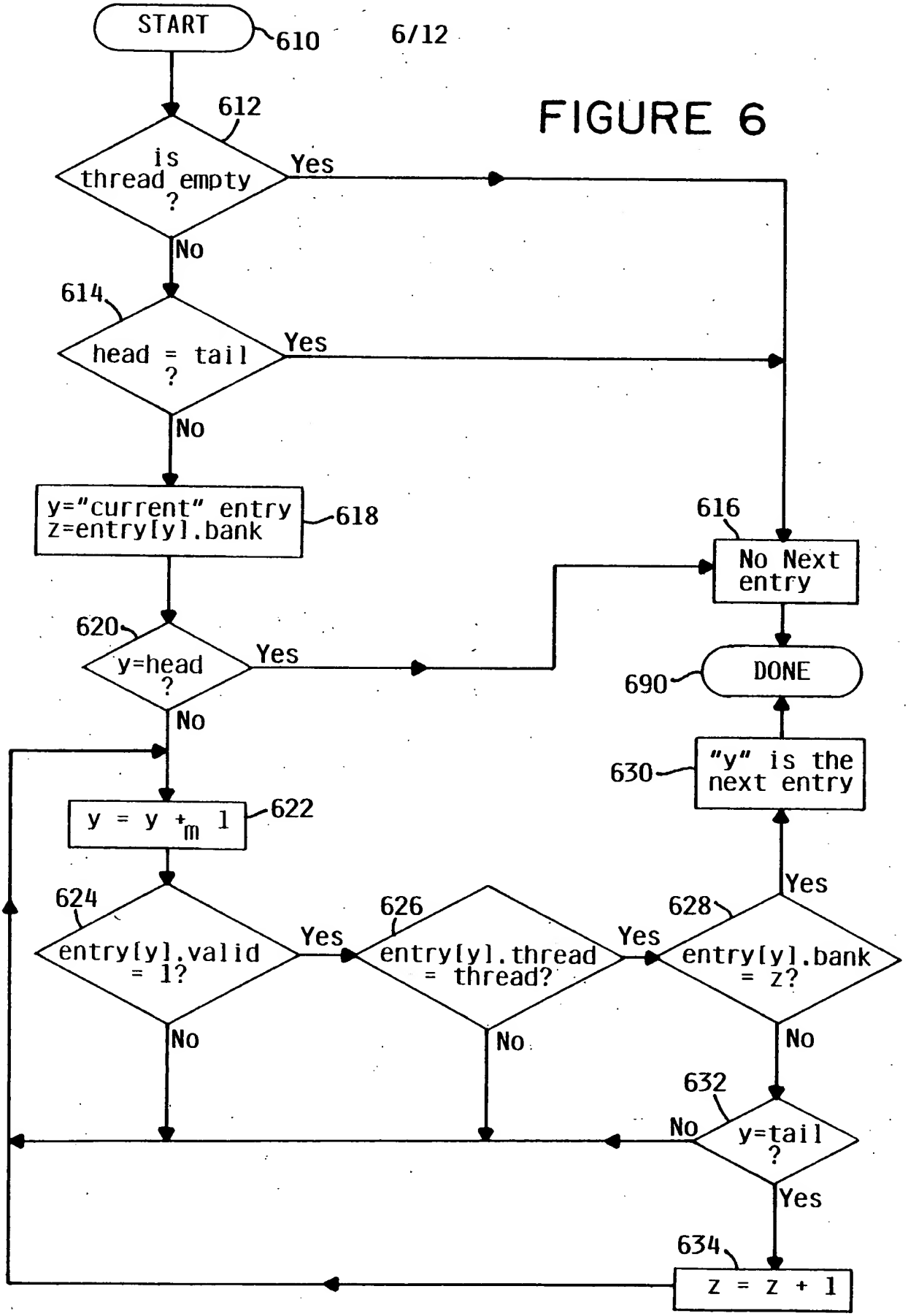

START
510
512
head = tail ?
No
Yes
520
entry[head].valid = 1?
Yes
522
entry[head].thread = thread?
Yes
No
No
524
thread is empty
514
thread is not empty
DONE
525
500

FIGURE 5

FIGURE 6



FOR EXAMINATION PURPOSES

FIGURE 7

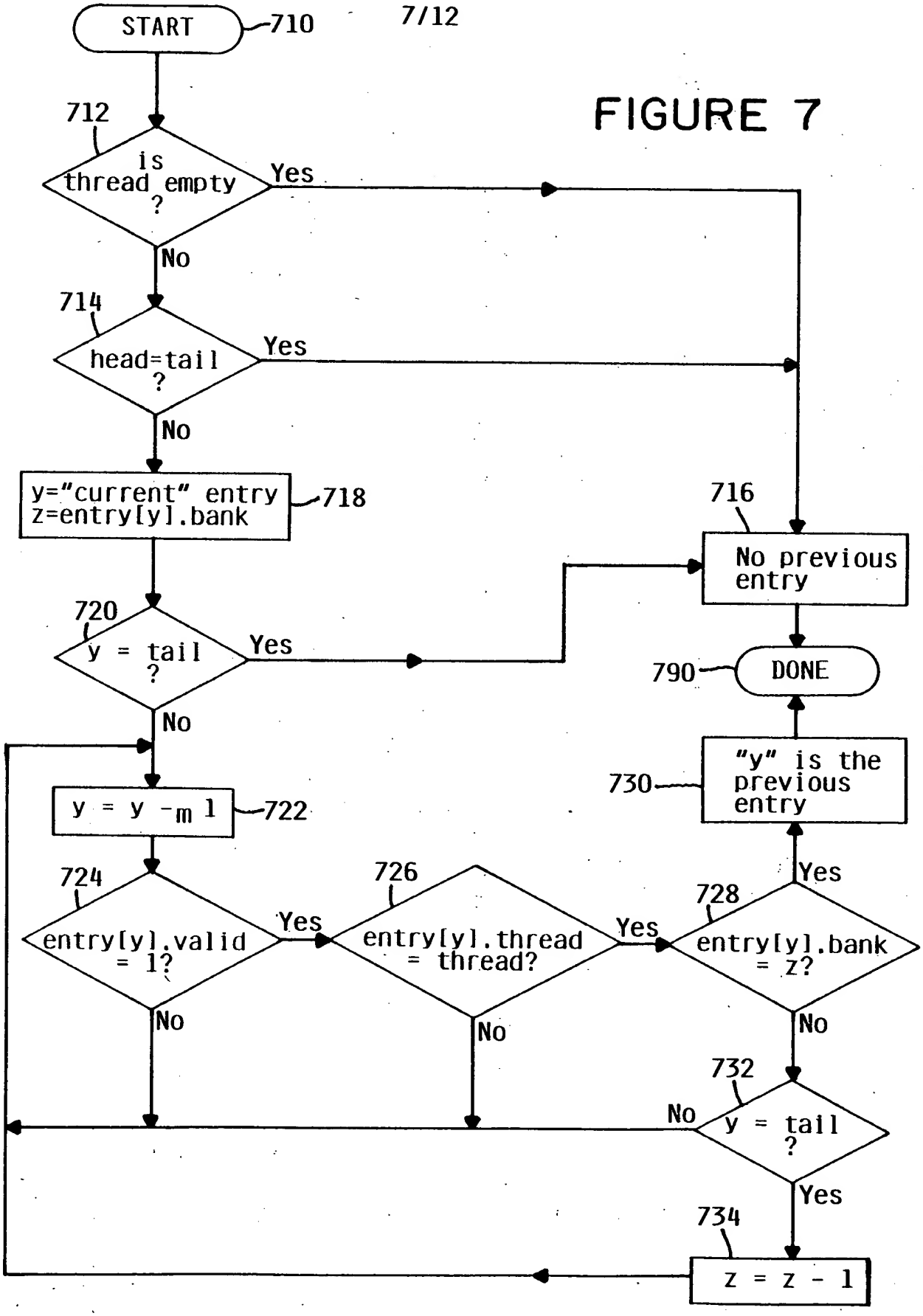


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FIGURE 8

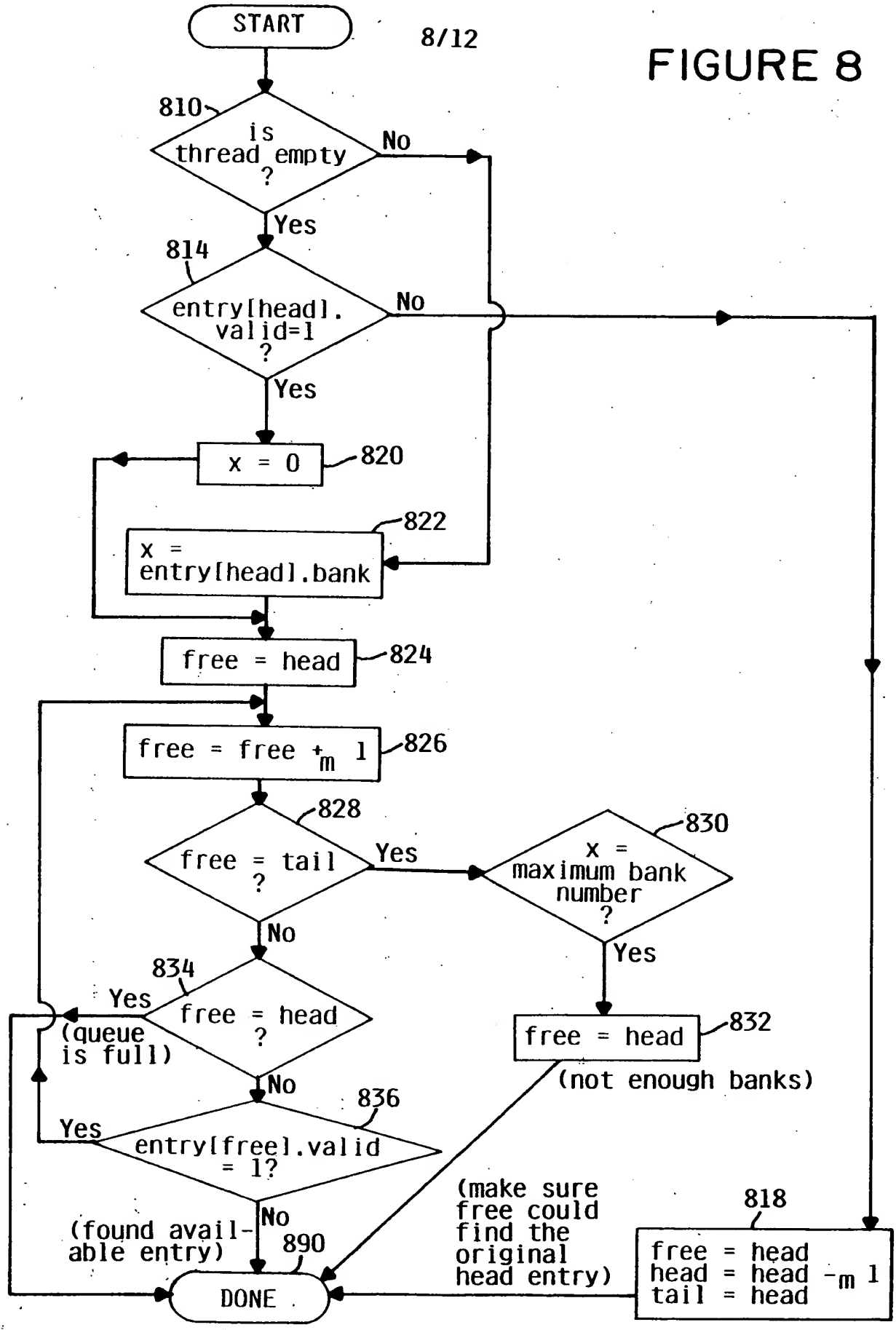

START
810
is thread empty ?
No
Yes
814
entry[head].valid=1 ?
No
Yes
x = 0
820
822
x = entry[head].bank
free = head
824
free = free +m 1
826
828
free = tail ?
Yes
830
x = maximum bank number ?
No
Yes
834
Yes
free = head ?
(queue is full)
No
836
Yes
entry[free].valid = 1?
No
(found available entry)
890
DONE
free = head
832
(not enough banks)
(make sure free could find the original head entry)
818
free = head
head = head -m 1
tail = head

FIGURE 9

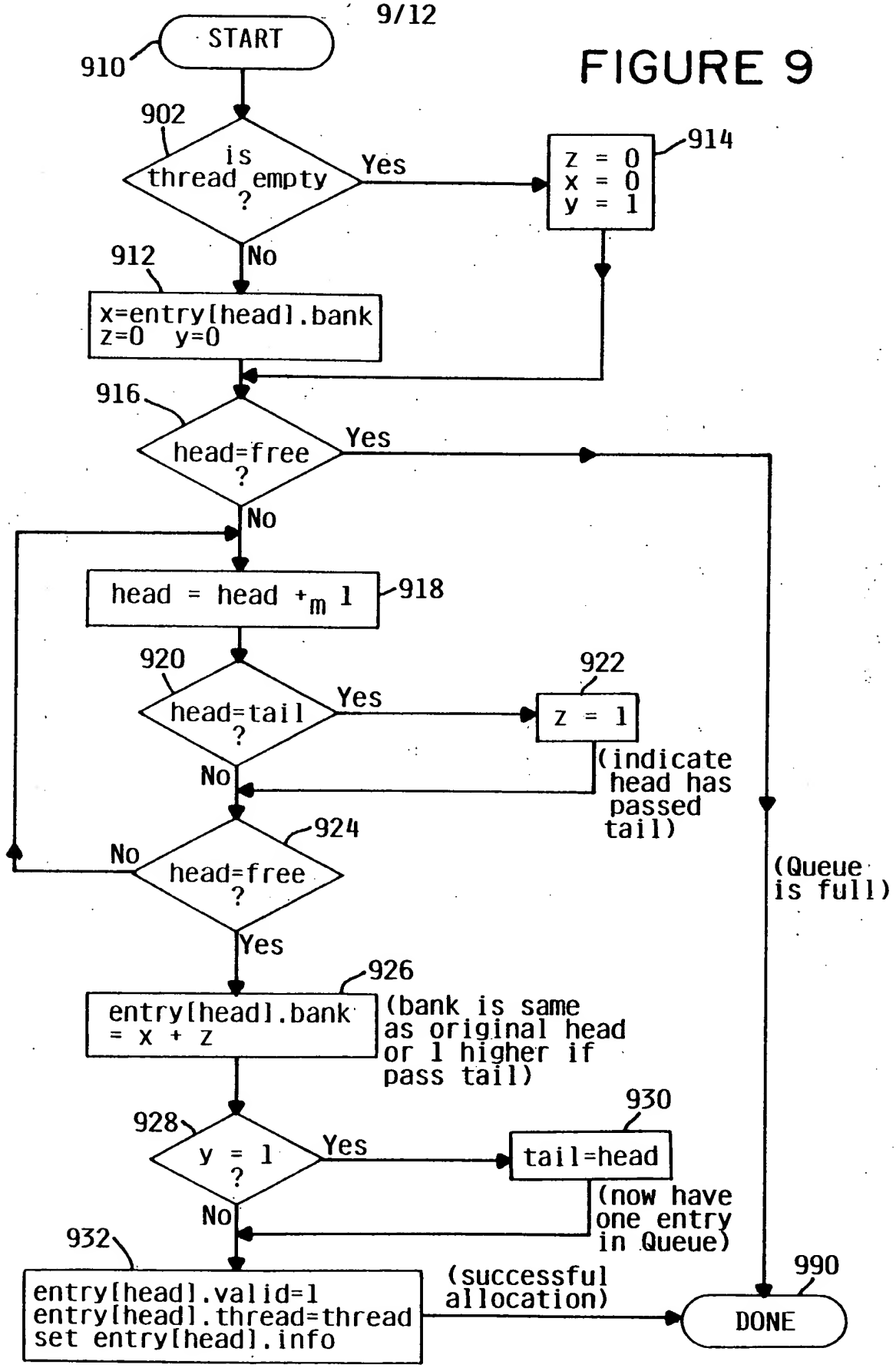
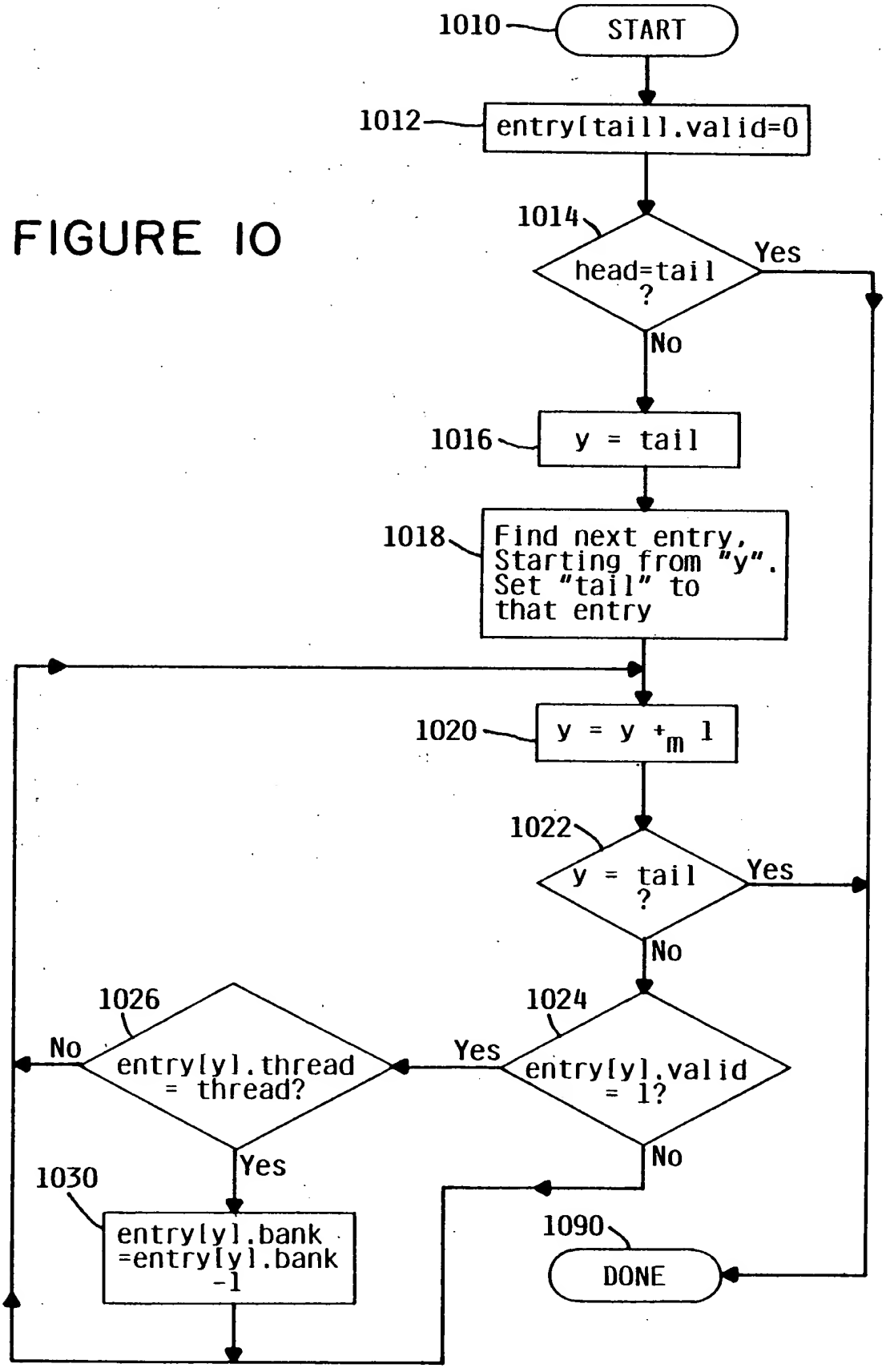

START
910
902
is thread empty ?
Yes
914
z = 0
x = 0
y = 1
No
912
x=entry[head].bank
z=0 y=0
916
head=free ?
Yes
No
head = head +m 1
918
920
head=tail ?
Yes
922
z = 1
(indicate head has passed tail)
No
924
head=free ?
No
Yes
(Queue is full)
926
entry[head].bank = x + z
(bank is same as original head or 1 higher if pass tail)
928
y = 1 ?
Yes
930
tail=head
(now have one entry in Queue)
No
932
entry[head].valid=1
entry[head].thread=thread
set entry[head].info
(successful allocation)
990
DONE

FIGURE 10


1010
START
1012
entry[tail].valid=0
1014
head=tail ?
Yes
No
1016
y = tail
1018
Find next entry, Starting from "y". Set "tail" to that entry
1020
y = y +m 1
1022
y = tail ?
Yes
No
1024
entry[y].valid = 1?
Yes
No
1026
entry[y].thread = thread?
No
Yes
1030
entry[y].bank =entry[y].bank -1
1090
DONE

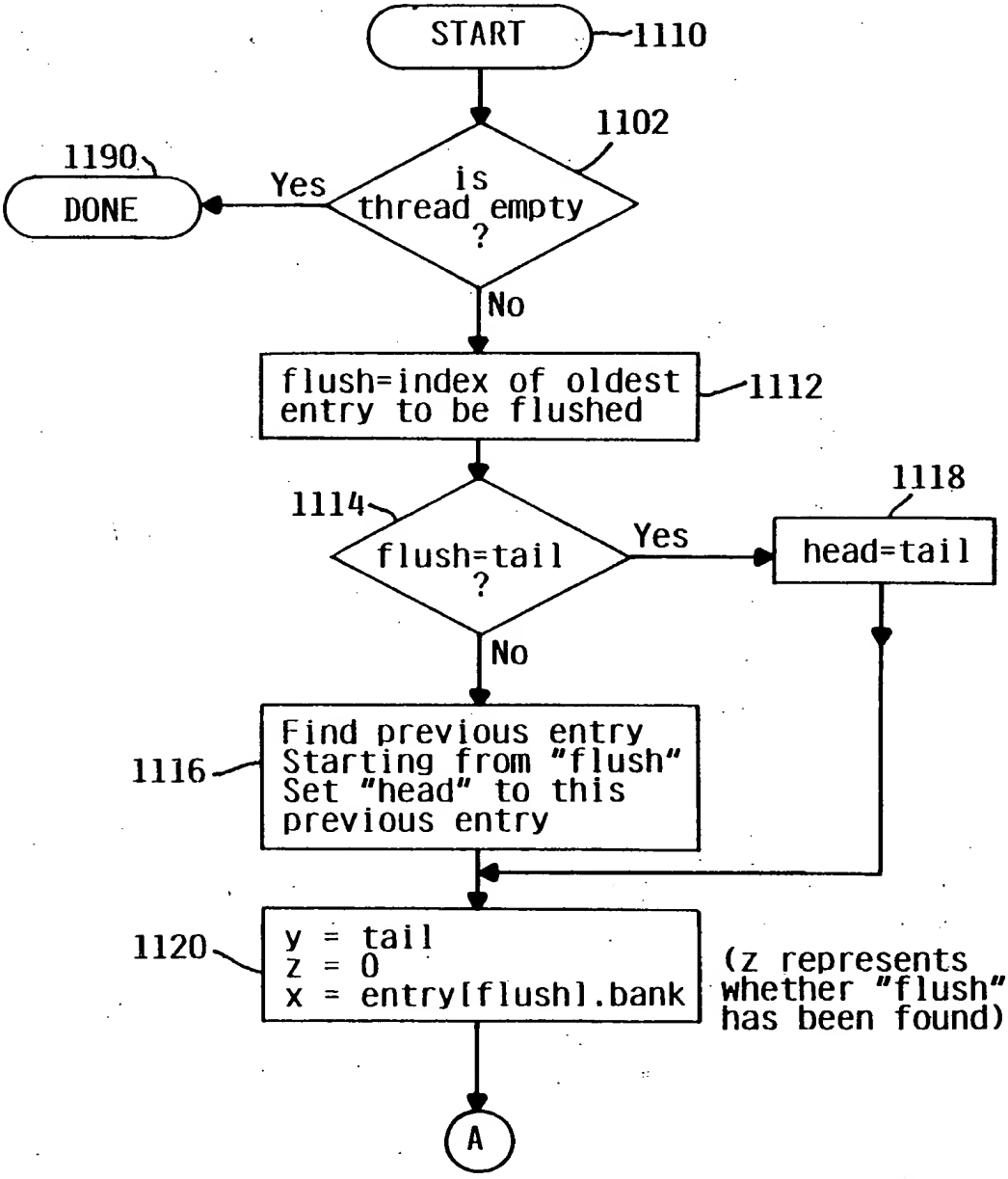

START
1110
1102
1190
DONE
Yes
is thread empty ?
No
flush=index of oldest entry to be flushed
1112
1114
flush=tail ?
Yes
1118
head=tail
No
Find previous entry Starting from "flush" Set "head" to this previous entry
1116
y = tail
z = 0
x = entry[flush].bank
1120
(z represents whether "flush" has been found)
A

FIGURE 11A

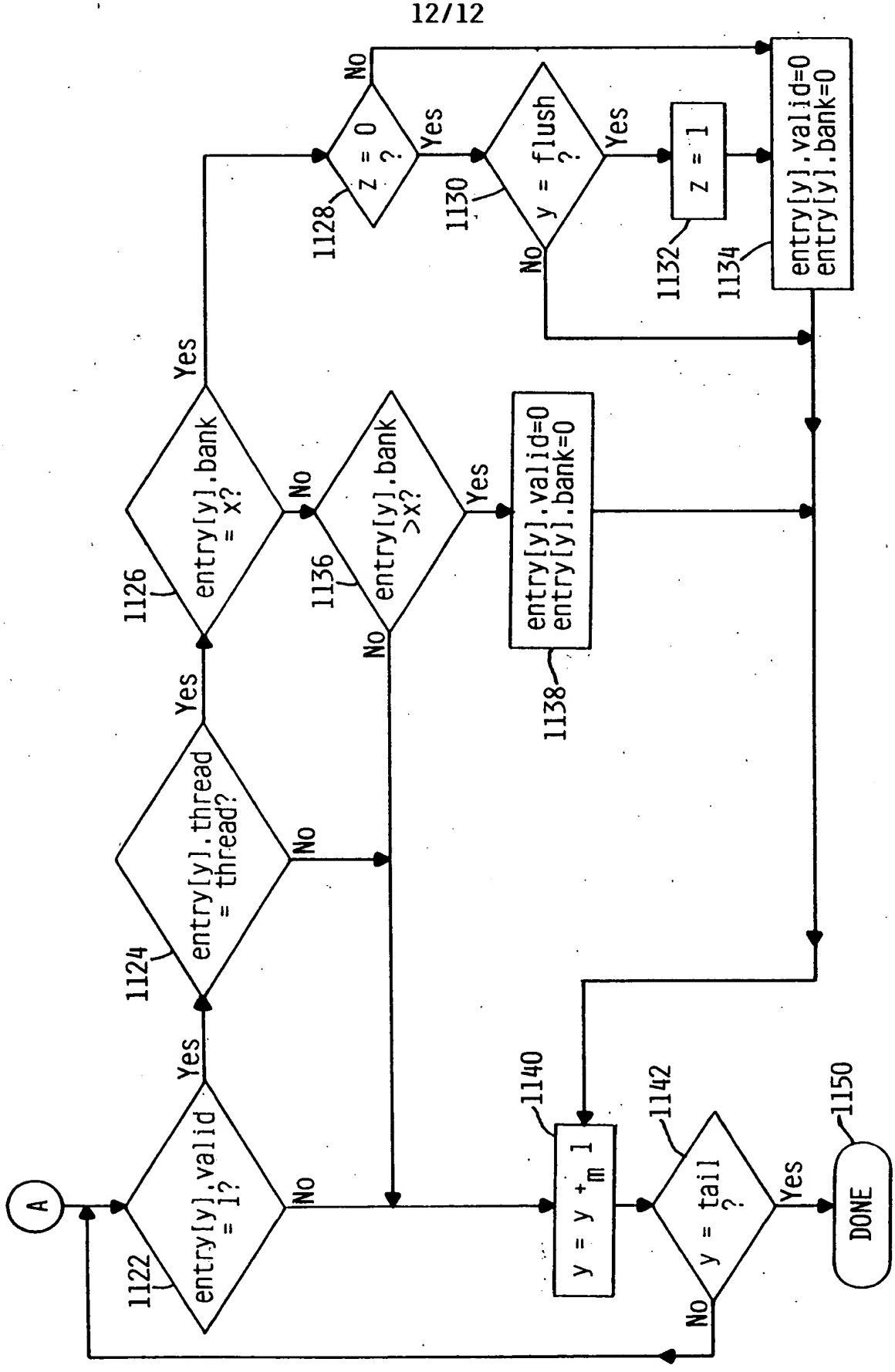

A
entry[y].valid = 1?
1122
No
Yes
entry[y].thread = thread?
1124
No
Yes
entry[y].bank = x?
1126
No
Yes
entry[y].bank >x?
1136
No
Yes
entry[y].valid=0
entry[y].bank=0
1138
z = 0 ?
1128
No
Yes
y = flush ?
1130
No
Yes
z = 1
1132
entry[y].valid=0
entry[y].bank=0
1134
y = y +m 1
1140
y = tail ?
1142
No
Yes
DONE
1150

FIGURE 11B